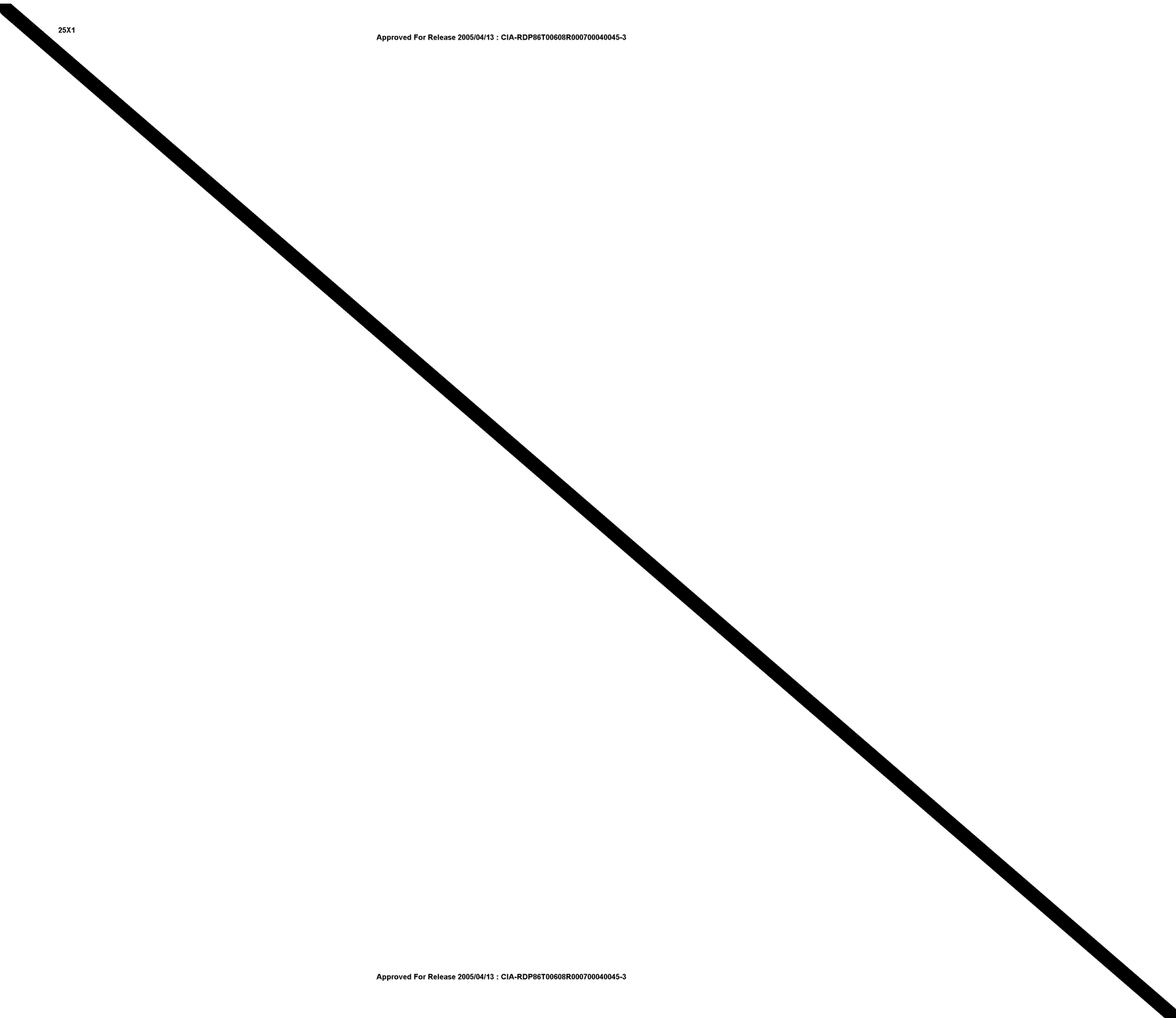

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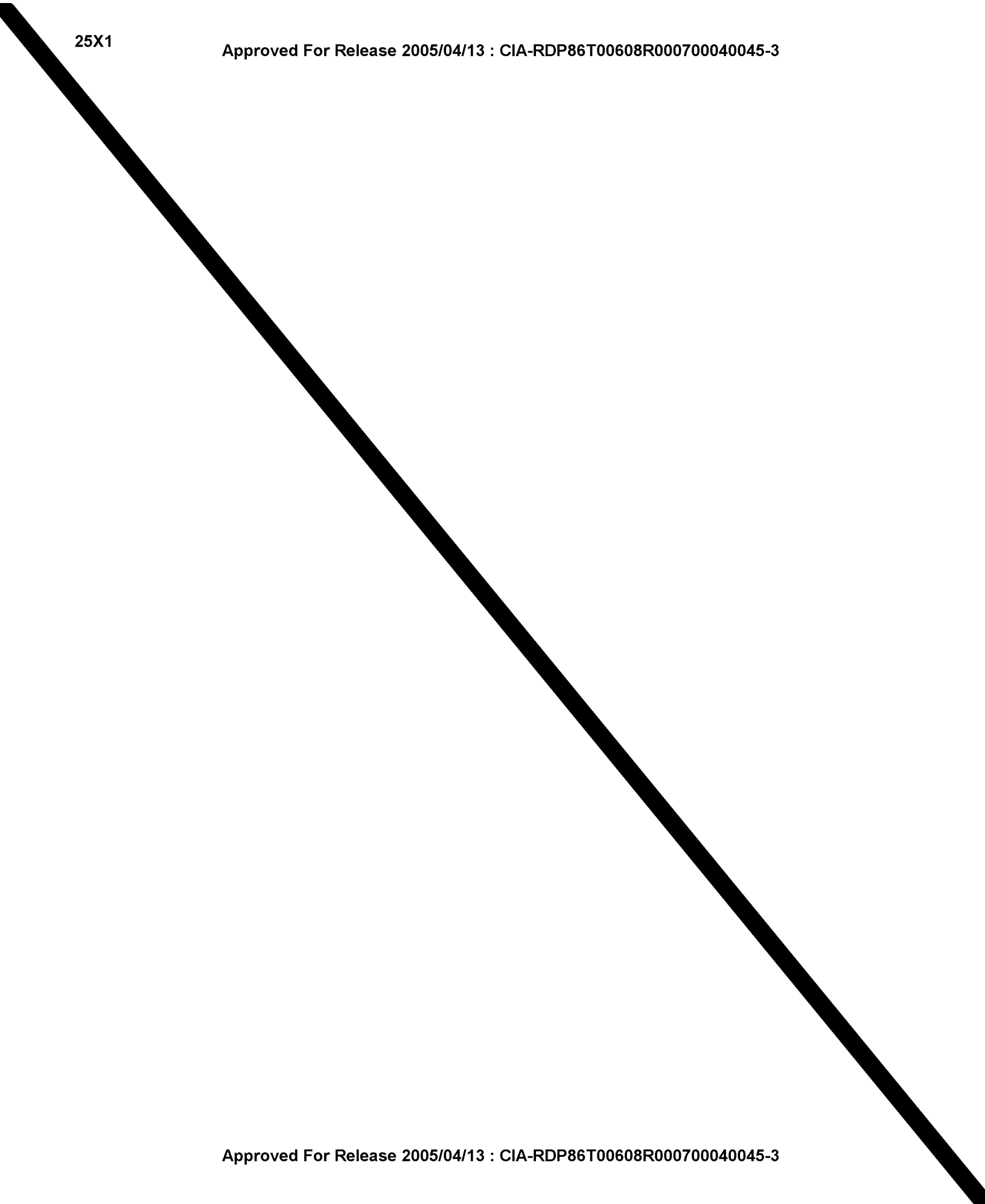

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WEEKLY SURVEYOR

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USSR AND EASTERN EUROPE

Soviet reliance on cytoplasmic male sterility to produce hybrid corn seed makes corn hybrids highly vulnerable to disease outbreaks. Major corn crop losses could occur in the USSR due to lack of genetic diversity if new virulent disease biotypes or mutants evolve.

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The Soviets continue to have difficulty in providing adequate care for research animals at the Institute of Medico-Biological Problems, Moscow. The poor health of research animals at this institute probably has been responsible for delays in research associated with the manned space program.

The major thrust of the research at the Batumi dolphinarium was again identified as determining the basic intelligence of dolphins. The dolphins are being taught more complex tasks and also behavior patterns that are relevant to military operations.

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Advanced submarine rescue vehicle technology probably will be passed to the Soviets. The acquisition of such technology would improve Soviet military capability for undetected diver lockout operations using a "mother" submarine.

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The USSR has developed a time compression spectrum analyzer using ferrite cores as the storage element. Its high resolution would be useful for such applications as ship quieting and passive acoustic detection.

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The USSR faces a constant threat of major wheat losses due to leaf rust disease. The Soviets are experimenting with a German-developed rust control chemical and with a new US compound, Indar. Indar appears to be the more promising chemical to investigate.

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The Soviets are using antiaircraft artillery, normally used in their hail dissipation program, as a stop-gap drought relief measure to increase rainfall. The results

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from these hastily designed operations will be difficult to evaluate although existing instrumentation set up for hail operations will make the task somewhat easier.

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A Public Council for the coordination of scientific investigations on the problems of communist upbringing of youth has been formed in the USSR. This is an indication of the current trend toward the scientific evaluation of education, socialization, and indoctrination.

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The Soviets are continuing their manned spaceflight program with vigor. It is expected that they will have several manned flights per year in the near future

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MIDDLE EAST AND ISLAMIC WORLD

A recent study indicated that the Arabs and Israelis may have a cultural inability to respond reliably to verbal instructions of right to left commands. It was hypothesized that this may be a cortical deficit and thus difficult to ameliorate.

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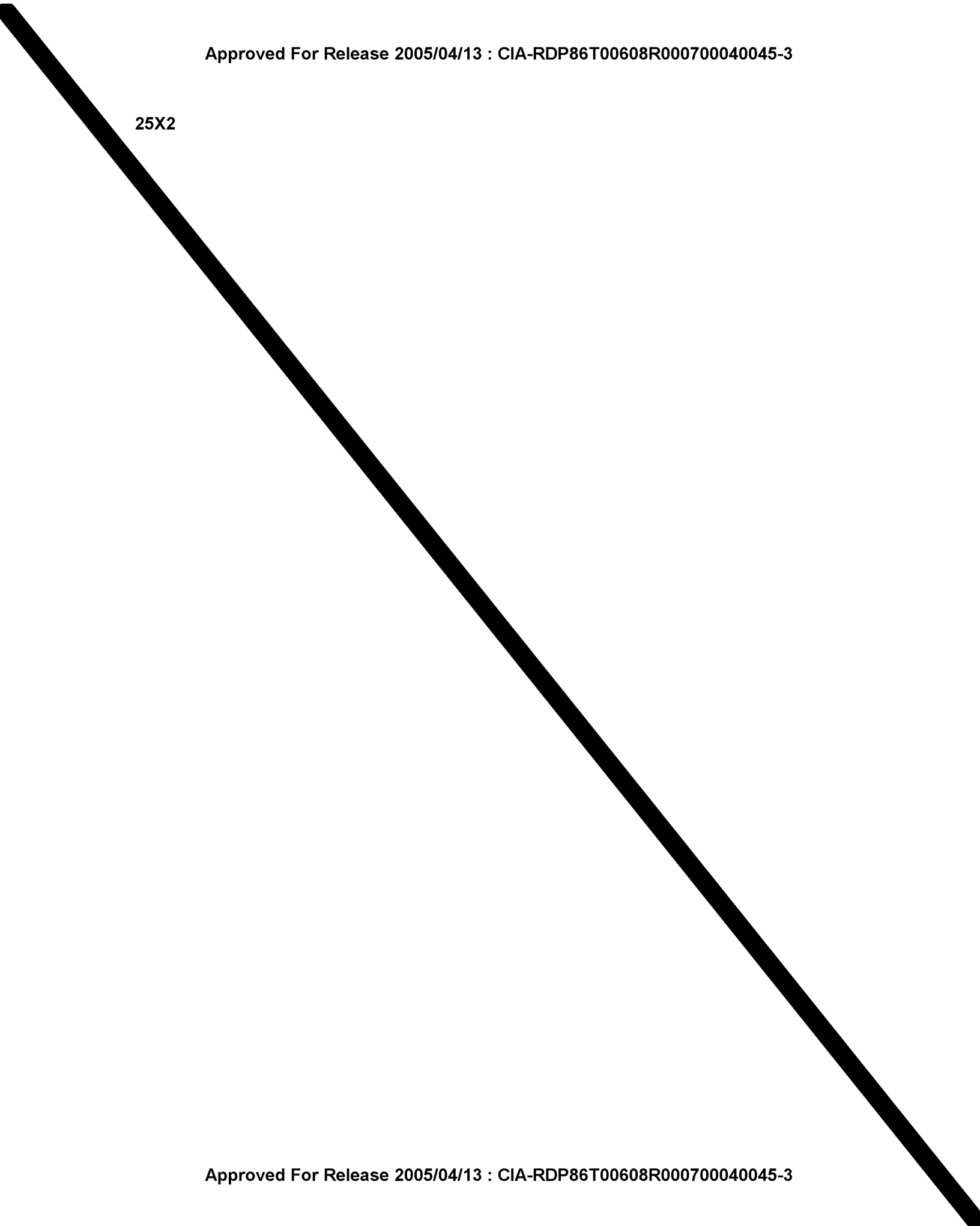

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SPACE

Soviets Continue to Have Difficulty Providing Adequate Care for Research Animals at IMBP: Dr. Igor Krasnov of the Institute of Medico-Biological Problems (IMBP), Moscow, has stated that the Soviet research institutes have severe problems controlling diseases, especially respiratory diseases, in their animal care facilities. Of particular concern to Dr. Krasnov was the etiology and prevention of otitis media (infection of the middle ear) in rodents. Krasnov gave the impression that general animal care in the USSR is 10 to 15 years behind the US.

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Comment: The health of research animals at IMBP probably has been a problem in the past and apparently is continuing to be responsible for delays in research associated with the Soviet manned space program. Such delays could have resulted from a lack of animals for critical research and erroneous conclusions resulting from experiments with animals of questionable health.

Soviet research on animals having otitis media could have resulted in exaggerated Soviet research findings on vestibular effects which could partially account for the great concern for the cosmonauts by Soviet physicians.

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Soviet Soyuz 13 Cerebral Circulation Experiment Produces Questionable Conclusions: Drs. Yu. E. Moskalenko, G. B. Weinstein and U. N. Senernja of the Institute for Evolutionary Physiology and Biochemistry, Moscow have interpreted the results of their rheographic investigation of Soyuz 13 cosmonauts. They conclude that prolonged weightlessness changes the neurogenic control of cerebral circulation. This control results from sensory impulses throughout the whole body.

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Comment: The implication by this leading group of Soviet physiologists that prolonged stays in a zero gravity environment cause changes in cerebral blood flow could heighten Soviet concern with regard to future long term manned spaceflight. Such concern, however, would not

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be well founded because the conclusions are not justified from the design of their experiment.

While changes were obtained in impedance signals under various conditions of weightlessness, the technique used is impedance plethysmography which is more a measure of pressure changes rather than changes of flow. Further, cerebral circulation is controlled largely by autoregulation; the degree of neurogenic control to which it is subject, if any, is an open question at the present time. As a result, the meaning of the data obtained from the experiment is really quite obscure.

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Soviet Manned Space Flight Program to Continue: The USSR is planning to continue its manned space flight program vigorously. The Soviets presented 51 papers on space biomedicine at the annual COSPAR meeting in Varna, Bulgaria, during June. The Soviets are studying the problems related to the effects of weightlessness and space radiation on cosmonauts and are giving extensive support to basic biological research to solve these problems.

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DEFENSIVE SYSTEMS

Soviets Have Developed a Time Compression Analyzer with Ferrite Cores: A recently translated 1972 Soviet article discusses the use of ferrite core memories as the storage elements in low frequency time-compression spectrum analyzers. The article concludes with a description of a Soviet analyzer with input bandwidths of 1 to 20 Hz, 5 to 100 Hz or 25 to 500 Hz. Resolution is 1/200 of the maximum input frequency, i.e., from 0.1 to 2.5 Hz.

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Comment: The Soviet analyzer does not appear in instrument catalogs and is not in mass production for general use. Small quantities, however, may have been produced since the early 1970s for special applications such as ship quieting and passive acoustic detection.

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LIFE SCIENCES

Soviets May Obtain Advanced Submarine Rescue Vehicle Technology: The Royal Swedish Navy ordered an underwater rescue vehicle (URF) in early 1974 to be delivered in 1977. The URF will be built by the Swedish shipyard Kockums in cooperation with the French company COMEX. The URF will have the following characteristics: a length-13.5 m; beam-4.3 m; height-3.9 m; displacement-49 tons; maximal diving depth-460 m; and maximal rescue depth-300 m. Operating endurance is 90 hours with a maximum speed of 3 Kts. At the present time, all Swedish underwater work using either submersibles or divers is supported from the surface, there are many indications that in the future support will be handled on the sea floor using a "mother" submarine and a work submersible similar to the rescue vehicle.

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Comment: The Swedish URF appears to be similar but an improved model of the existing Soviet submersible

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which probably was constructed also in collaboration with COMEX. Because of the close ties the Soviets have with Sweden and France, the Soviets probably will acquire this new technology.

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The acquisition of such technology would improve Soviet military capability for undetected diver lockout operations using a "mother" submarine.

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AGROTECHNOLOGY AND FOOD RESOURCES

Soviet Hybrid Corn Is Vulnerable to Potential Epidemic Disease Outbreaks: At the International Maize (Corn) Symposium in September, it was reported that the Soviet Union still relies heavily on cytoplasmic male sterility (CMS) to produce hybrid corn seed. The Soviet corn breeders apparently have failed to assess the risks of using CMS technology. The "T" cytoplasm technology results in a genetic uniformity which makes the derived hybrid corn highly vulnerable to disease epidemics. [redacted] 25X1

25X1 Comment: Soviet corn hybrids produced by using CMS (primarily T) are highly vulnerable to disease, insect and environmental hazards. Thus, major corn crop losses could occur in the USSR due to lack of genetic diversity if new disease biotypes or mutants virulent for "T" cytoplasma-derived corn hybrids evolve in the USSR. Northern corn leaf blight is endemic to the USSR, and it has the genetic potential to develop more virulent biotypes against a background of corn genetic uniformity. One of the primary disease threats in the US, southern corn leaf blight, is not known to occur in the USSR, and it also would pose a threat if accidentally introduced. Other diseases of potential threat to Soviet corn hybrids are maize dwarf mosaic, corn stunt mycoplasm and Phyllosticta leaf blight.

In 1970 an epidemic of southern corn leaf blight caused yield losses of 50% or more in some southern US states and 15% nationwide. The epidemic resulted from a single source of CMS (75-80% of the total corn acreage) and a new virulent mutant of corn blight. About 12% of the US corn seed production now utilizes CMS, however, the blight epidemic of 1970 continues to make all types of CMS suspect in terms of disease vulnerability. [redacted] 25X1

Soviets Pursue Chemical Control R&D to Alleviate Threat of Wheat Rust Disease: Soviet plant pathologists are continuing intensive research to discover methods of controlling wheat leaf rust. The Soviets are experimenting with a German-developed rust control chemical. They also are highly interested in a new compound, Indar, which was 25X1

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developed by a US firm and is being tested experimentally in India. The potential of this compound is impressive. Reportedly, 2 ounces will treat 100 pounds of seed wheat and retard rust development until the plant matures enough to be only minimally affectd by the disease.

Comment: The Soviet Union faces a constant threat of major losses due to wheat rust outbreak. Their winter and spring wheat varieties are susceptible to this disease and the prevalence of virulent disease biotypes in the USSR. Development of rust resistant varieties, even at a greatly forced tempo, will require at least several years. The Soviet development or acquisition of an effective and reasonably economical means of chemical control employed on a large scale could bridge the gap until resistant wheat varieties become available.

Of the two rust control chemicals, Indar probably has the greater potential, but it may be of limited use to the USSR. This chemical has been tested only on spring wheat and may not be effective on winter wheat. The rust disease threat in the USSR is primarily to winter wheat and only secondarily to spring wheat. Indar functions systemically and requires only a one-time application. Once within the plant, the chemical retards the development of any rust infection that may occur until the plant matures. The German chemical probably is used as a foliage spray which prevents rust spore germination but requires repeated and timely applications.

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BEHAVIORAL SCIENCES

Intricate Behavioral Training Reported at the Batumi Dolphinarium: Andrey Shevalov was designated as supervising a group investigating the capabilities of dolphins at the Batumi dolphinarium. The investigations have included teaching multiple chains of behavior to dolphins i.e., the dolphins had to perform a number of responses in a fixed pattern to obtain rewards. Shevalov emphasized that the dolphins also are trained in skills which would be useful to man and such training would reveal the maximum abilities of dolphins. Dolphins already have been taught to pull a boat and to push a ring-buoy up to a swimmer. 25X1

Comment: This report supports previous evidence that the major thrust of the research at Batumi is examining the basic intelligence of dolphins. The training tasks appear to be more complex and varied than previously reported and require more behavioral training expertise. Soviet claims that the animals have been taught to perform useful tasks indicate that some success in conditioning the animals has been attained. 25X1

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Arabs and Israelis May Share Common Human Factors Problem: A recent study investigated the ability of Arabs, Israelis, Europeans, and Americans to respond to verbal instructions involving either right or left sided movements. For the Arabs, 42 percent responded with hesitation and an initial movement of the eyes in the wrong direction. The corresponding figure for the Israelis, 36 percent wrong, was not significantly different from that of the Arabs. The percentage for Europeans and Americans, however, was large and significantly different--3 percent wrong. hypothesized that this Arab-Israeli deficit is due to a fixed pattern of cerebral functioning associated with reading from right to left.

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Comment: It would be fair to label the response differences reported as a cultural deficit for both the Arabs and Israelis. This deficit has implications for performance of the groups in any system or operation in

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which right-left command or actions are necessary. Under stress and time constraints (e.g., combat), this problem would be magnified. Any display showing a mirror image also would tend to increase error rates. Although training may alleviate a left-right confusion problem to some extent, this solution may not be applicable for the Arabs and Israelis. If the diagnosis of the etiology of this problem is correct, most types of training may not be effective.

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Soviet Council Established to Control Research on Communist Upbringing: A Public Council for the coordination of scientific investigations on problems of communist upbringing of youth has been formed at the All-Union Lenin Young Communist League and the USSR Academy of Pedagogical Sciences. The council's responsibilities include determining basic directions and specific programs for upbringing, coordinating research on the problems of youth education and assuring that the research results are applied.

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Comment: The creation of this council is an indication of the trend toward a scientific evaluation of education, socialization and indoctrination. Instead of relying on collective competition and the traditional rote learning approach, empirical data are being sought to give a rational basis to the production of the "new Soviet man" (the reliable worker whose goals are subservient to the state).

A leading advocate of this trend is L. V. Zankov, a leading researcher and theorist in the field of upbringing. Although the Soviet leadership is not satisfied with the behavior of the citizenry produced by the present system, the field of education does not have the financial support as that of military programs or heavy industry. Drastic changes are not expected in education, but a greater diversity and willingness to examine new educational methods are probable.

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PHYSICAL SCIENCES AND TECHNOLOGIES

Soviets Use Artillery in Rain-Making Experiments: Several artillery shells loaded with chemicals were fired at clouds in Georgia to produce rain which reportedly fell for the first time in a month. Specialists from Georgia, Armenia, and Moscow participated in the experiment.

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Comment: This is the first time the Soviets are known to have used artillery for seeding clouds to increase rainfall; aircraft normally have been used for this purpose. For several years, however, the Soviets have used an extensive network of antiaircraft artillery [redacted] in the Caucasus area as part of their hail dissipation program. These rain augmentation experiments very likely used this existing hail equipment as a stop-gap measure to alleviate the current drought.

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Antiaircraft artillery using shells loaded with lead or silver iodide are a fairly effective and inexpensive means for seeding clouds. On the other hand, aircraft seeding provides much more mobility to seed targets of opportunity. The results of rain enhancement experiments are very difficult to evaluate even under ideal conditions and even more difficult from hastily designed experiments, such as these probably were. Nevertheless, the use of an existing instrumented network may make the Soviets' task a bit easier. [redacted]

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